

REMARKS

Claims 1-23 and 25-31 are pending in this application. By this Amendment, claim 7 is amended to correspond with U.S. practice and claims 26-31 are added. Support for new claim 26 can be found, for example, at original claims 1 and 12; support for new claim 27 can be found, for example, at original claims 1 and 13; support for new claim 28 can be found, for example, at original claims 1 and 14; support for new claim 29 can be found, for example, at original claims 1 and 16; support for new claim 30 can be found, for example, at original claims 20 and 21; and support for new claim 31 can be found, for example, at original claims 20 and 22. No new matter is added.

I. Allowable Subject Matter

Applicants thank the Examiner for the indication that claims 12-14 and 21-22 contain allowable subject matter. Specifically, these claims are indicated as allowable if rewritten in independent form to include all of the features of the base claim and any intervening claims. Applicants appreciate this indication of allowability, but respectfully submit that at least claims 1 and 20, from which these claims variously depend, and the other claims depending from claim 1, are allowable for at least the reasons indicated below.

II. Claim Rejections Under 35 U.S.C. § 103**A. Aitken '609**

The Office Action rejects claims 1-11, 15-20, 23 and 25 under 35 U.S.C. § 103(a) as being unpatentable over Aitken et al. (U.S. Patent No. 7,143,609) ("Aitken '609").¹ Applicants respectfully traverse the rejection.

As recited in claims 1 and 20 and new claims 26-31, M represents Rb, Cs, Na, K or Zn; X represents Cl, Br or I; and MX comprises 2-25 mol% of the total composition. The

¹ "Kudo et al." is mentioned at page 5 of the Office Action, but is not part of any rejection. Thus, it is not further addressed herein.

Office Action acknowledges that Aitken '609 does not disclose 2-25 mol% MX. See Office Action at p. 3, lines 4-5.

Nevertheless, the Office Action argues, "Although Aitken et al. does not expressly disclose an amount of 2-25% of MX wherein M represents at least one metal chosen from Rb, Cs, Na, K and Zn, and X represents at least one chlorine, bromine or iodine atom, the reference clearly discloses the use of both, some of said metals, and some of said halides in chalcogenide glasses. Therefore, it would have been obvious for said chalcogenide glasses to contain at least about 2% or 3% of such combination (MX) in said glasses." See Office Action at p. 3, lines 4-9. Applicants respectfully disagree.

First, Aitken '609 does not teach the compound MX, but separately introduces M and X into the chalcogenide composition independently from one another. According to Aitken '609, "Alternative kinds of glasses may include chalco-halide glasses. Chalco-halide glasses are similar in composition to the sample chalcogenides except for the addition of Cl, Br, and I." See Aitken '609 at col. 9, lines 48-51. Further, Aitken '609 states that other elements, such as rare earths or fluxes (e.g. Li, Na and K) may also be included. See Aitken '609 at col. 8, lines 30-33. However, Aitken '609 does not teach or suggest including the compound MX. This difference is important because the function of MX in the chalcogenide glasses is not the same as the functions of M and X when taken and added separately. Thus, contrary to the Office Action's conclusion, one of ordinary skill in the art would not have included 2% or 3% of MX in the chalcogenide glass disclosed in Aitken '609.

Secondly, Aitken '609 does not teach or suggest the claimed combination of molar percentages. As recited in claims 1, 20 and 26-31, M represents at least one alkali metal chosen from Rb, Cs, Na, K and Zn, and X represents at least one chlorine, bromine or iodine atom, and MX is 2-25 mol%. The compound represented by MX must have a specific molar ratio between the metal atom, M, and the halogen atom, X. For example, when M is Cs and

X is Br, the compound CsBr has a 1:1 molar ratio and when M is Zn and X is Cl₂, the compound ZnCl₂ has a 1:2 molar ratio. Thus, claims 1, 20 and 26-31 not only include the feature that MX be within the claimed range of 2-25 mol% with respect to the total composition, but that metal (M) and halide (X) must be present in a specified molar ratio with respect to the particular MX compound.

Aitken '609 does not disclose, teach or suggest the claimed 2-25 mol% of MX. Rather, Aitken '609 simply discloses that metal and halogens can be used in glass compositions without providing any specific molar amount. Thus, contrary to the Office Action's conclusion, one of ordinary skill in the art would not have included 2% or 3% of MX in the chalcogenide glass disclosed in Aitken '609.

As Aitken '609 does not teach or suggest the claimed MX in 2-25 mol%, claims 1, 20 and 26-31 would not have been rendered obvious by Aitken '609. Claims 2-19, 21-23 and 25 variously depend from claims 1 and 20 and, thus, also would not have been rendered obvious by Aitken '609. Accordingly, reconsideration and withdrawal of the rejection are respectfully requested.

B. Cole

The Office Action rejects claims 1, 2, 4-7, 8, 9 and 15 under 35 U.S.C. § 103(a) as being unpatentable over Cole et al. (U.S. Patent No. 6,128,429) ("Cole"). Applicants respectfully traverse the rejection.

As discussed above, in claim 1 and new claims 26-31, M represents Rb, Cs, Na, K or Zn; X represents Cl, Br or I; and MX comprises 2-25 mol% of the total composition.

The Office Action asserts that Cole teaches the use of up to 2 mol%, based on the glass components, of, for example, cesium and halides to make some improvements in the glass. Applicants respectfully disagree.

First, Cole does not teach the compound MX, but separately introduces M and X into the chalcogenide composition independently from one another. This difference is important because the function of MX in the chalcogenide glasses is not the same as the functions of M and X when taken and added separately. As discussed above, in claims 1, 20 and 26-31, M represents at least one alkali metal chosen from Rb, Cs, Na, K and Zn, and X represents at least one chlorine, bromine or iodine atom, and MX is 2-25 mol%. The compound represented by MX must have a specific molar ratio between the metal atom, M, and the halogen atom, X. Thus, claims 1, 20 and 26-31 not only include the feature that MX must be within the claimed range of 2-25 mol% with respect to the total composition, but that metal (M) and halide (X) must be present in a specified molar ratio with respect to the particular MX compound.

Moreover, Cole discloses a low phonon energy glass doped with a rare earth element and that other optical components such as halides can be added to the glass to improve optical, thermal and/or mechanical properties. Cole discloses that adding a halogen in an amount of up to 20 mol% can modify refractive index and increase rare earth solubility, and that including an additive such as cesium in a small amount of up to 2 mol%, can make some improvement. See Cole at col. 2, lines 47-60.

Cole does not combine the cesium with a halide in the specific form CsCl, CsBr or CsI. To the contrary, Cole suggests combining a halide with a rare earth metal so as to form a rare earth halide. See Cole at col. 3, lines 37-38. Thus, one of ordinary skill in the art would not have prepared the claimed vitroc ceramic composition comprising MX in 2-25 mol%.

As Cole does not teach or suggest the claimed MX in 2-25 mol%, claims 1 and 26-31 would not have been rendered obvious by Cole. Claims 2, 4-7, 8, 9 and 15 variously depend from claim 1 and, thus, also would not have been rendered obvious by Cole. Accordingly, reconsideration and withdrawal of the rejection are respectfully requested.

C. Aitken '584

The Office Action rejects claims 1, 2 and 4-11 under 35 U.S.C. § 103(a) as being unpatentable over Aitken et al. (U.S. Patent No. 5,389,584) ("Aitken '584"). Applicants respectfully traverse the rejection.

As discussed above, claim 1 recites a vitroceramic composition comprising MX, wherein M represents at least one alkali metal chosen from Rb, Cs, Na, K or Zn; X represents at least one chlorine, bromine or iodine atom; and MX comprises 2-25 mol% of the total composition.

As is the case with Aitken '609 and Cole, Aitken '584 does not teach the compound MX, but introduces M and X into the chalcogenide composition independently of one another. This difference is important because the function of MX in the chalcogenide glasses is not the same as the functions of M and X, when taken and added separately from one another. Furthermore, in the claimed composition, the presence of MX is 2-25 mol% of the total composition and MX designates a specific molar ratio between M and X. Aitken '584 does not teach this specific molar ratio and, thus, does not teach or suggest the function of MX taken together.

As Aitken '584 does not teach or suggest the claimed MX in 2-25 mol%, claim 1 would not have been rendered obvious by Aitken '584. Claims 2 and 4-11 depend from claim 1 and, thus, also would not have been rendered obvious by Aitken '584. Accordingly, reconsideration and withdrawal of the rejection are respectfully requested.

III. Conclusion

In view of the foregoing, it is respectfully submitted that this application is in condition for allowance. Favorable reconsideration and prompt allowance of the application are earnestly solicited.

Should the Examiner believe that anything further would be desirable in order to place this application in even better condition for allowance, the Examiner is invited to contact the undersigned at the telephone number set forth below.

Respectfully submitted,



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Attachment:
Amendment Transmittal

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